NON-PUBLIC?: N
ACCESSION #: 9404260318
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Haddam Neck PAGE: 1 OF 05

DOCKET NUMBER: 05000213

TITLE: Automatic Reactor Trip During Reactor Coolant Pump Bus Transfer
EVENT DATE: 03/28/94 LER #: 94-009-00 REPORT DATE: 04/21/94

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 007

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: S. Doody, Asst. Engineer TELEPHONE: (203) 267-2556

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: AB COMPONENT: 52 MANUFACTURER: W120
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On March 28, 1994 at 2227 hours with the plant in mode 1 and reactor power approximately 7 percent of rated thermal power, an automatic reactor trip occurred while performing Normal Operating Procedure (NOP) 2.1-6, "Reactor Just Critical to Minimum Load." When the operators transferred the 4160 volt electrical power supply to reactor coolant pump bus 1-1A from offsite power to the main generator, circuit breaker 3T-1A opened however 309-1A failed to close. Subsequently, indicated reactor power exceeded the P-7 permissive enable setpoint while reactor coolant pumps 1 & 2 were de-energized. Before breaker 3T-1A could be reclosed, the 2 out of 4 reactor coolant low flow trip logic was satisfied and the reactor tripped. The cause of this event was equipment failure and a procedure deficiency. Immediate corrective actions consisted of a procedure revision to NOP 2.1-6 and the repair/reinstallment of breaker 309-1A. This event is reportable under 10CFR50.73 (a) (2) (iv) since it resulted in an automatic actuation of the Reactor Protection System.

END OF ABSTRACT

BACKGROUND INFORMATION

The Reactor Protection System (EIIS Code: JC) consists of two separate trains which receive an input from various systems' instrumentation circuits to activate protective interlocks and a reactor trip. The reactor coolant low flow trip signal will cause a reactor trip to occur if the flow in any two reactor coolant loops drops below 90 percent of rated full flow.

The reactor protection system also provides protective interlocks, including a Protection Permissive (P-7). P-7 will automatically block various reactor trips, including reactor coolant low flow, when power is less than 10 percent (allowable value) as indicated on 3 out of 4 Power Range nuclear instrumentation channels and turbine first stage pressure. At the Haddam Neck Plant the setpoint on P-7 is 7.5 percent power. The operators verify that power is below P-7 when the "Power Level Below Permissive #7" annunciator on the main control board is illuminated. When power is greater than the 7.5 percent setpoint, as sensed by either turbine first stage pressure or 2 of 4 power range nuclear instruments, P-7 will clear and the reactor coolant low flow trip will be enabled.

Normal Operating Procedure, NOP 2.1-6, "Reactor Just Critical to Minimum Load", provides steps to maintain the plant at a "Reactor Just Critical" (Mode 2) condition and increase power to a minimum load of approximately 30 MWe. Prior to transferring Reactor Coolant Pump (RCP) power supply from offsite power to the main generator this procedure directs the operators to raise turbine load to 20-30 MWe while staying below the P-7 setpoint.

The 1 & 2 RCP's are powered from the 4160V bus 1-1A (See Figure 1). During plant startup bus 1-1A is supplied from bus 1-3 (offsite power) via circuit breaker (EIIS Code:52) 3T-1A. After the main generator is connected to the grid the operator transfers the bus 1-1A power supply from offsite to the generator by closing circuit breaker 309-1A breaker control switch. The bus tie breaker, 3T-1A, will automatically trip and 309-1A will close after a 1 second time delay.

Breaker 309-1A is a stored energy breaker which utilizes a large spring to provide the motive force to operate the closing mechanism. When the breaker is removed from the cubicle the closing spring discharges. A DC charging motor is used to charge the spring immediately upon breaker

closure or when an uncharged breaker is installed after removal and the DC control power knife switch is closed.

EVENT DESCRIPTION

On March 28, 1994, at 2227 hours with the plant in mode 1 and reactor power approximately 7 percent of rated thermal power, an automatic reactor trip occurred while performing NOP 2.1-6, "Reactor Just Critical to Minimum Load." The trip occurred during a second attempt to transfer the electrical power supply for RCP bus 1-1A from offsite power to the main generator. The first attempt at 2136 hours failed because breaker 309-1A did not close. An operator was sent to rack out and rack back in the 309-1A breaker. At 2227 hours a second attempt was made to transfer the RCP bus 1-1A. Before the transfer the control room operators performed step 6.3.8. which directs them to increase turbine load to approximately 20-30 MWe while maintaining power level below the P-7 setpoint. The alarm log indicates power level clearing and dropping below the P-7 set point several times prior to this transfer. The operator verified that power level was below P-7 at which time the 309-IA breaker control switch was turned to the close position, 3T-1A opened automatically but 309-1A failed to close. During the 3 seconds that 3T-1A was open and the RCP's were de-energized, reactor power exceeded the P-7 enabling set point and cleared on first stage pressure. Before breaker 3T-1A could be reclosed the 2 out of 4 reactor coolant loop low flow trip logic was satisfied and the reactor tripped with generator load at 21 MWe. Operators carried out Emergency Operating Procedure E-0 and stabilized the plant in Mode 3. All plant systems responded normally to the trip.

CAUSE OF THE EVENT

The cause of the reactor trip was procedure deficiency and equipment failure. Step 6.3.8 of NOP 2.1-6 directs the operators to increase turbine load to approximately 20-30 MWe while maintaining power below P-7. Prior to transfer of the RCP bus 1-1A power level fluctuated above and below the P-7 setpoint while maintaining turbine load within this specified band. The apparent cause for the failure of the 309-1A breaker to close is that the closing spring was not charged prior to attempting to close the breaker. A technical evaluation has determined that there are two credible causes for the failure. The limit switch that controls the charging motor did not make good electrical contact or the brushes in the charging motor hung up slightly in the brush holder due to carbon build up between the holder and the brush.

SAFETY ASSESSMENT

This event is reportable in accordance with 10CFR50.73(a)(2)(iv) since it resulted in an automatic actuation of the Reactor Protection System (RPS).

The automatic reactor trip was initiated due to the loss of reactor coolant flow while reactor power level was greater than P-7 (7.5 percent power). The loss of reactor coolant flow was due to the failure of breaker 309-1A during the transfer of reactor coolant pump power from offsite power to the main generator power supply. The failure of breaker 309-1A to close resulted in the loss of AC power to 2 of the 4 reactor coolant pumps. The reactor protection system performed as required and actuated an automatic reactor trip. All plant systems responded normally to the trip therefore the safety significance of this event is low.

CORRECTIVE ACTIONS

A procedure change has been made to NOP 2.1-6 to delete step 6.3.8, the reference to maintain 20-30 MWe when transferring the electrical supply for the RCP busses. The new guidance is to maintain power greater than the reverse power trip and below P-7 to prevent reactor power from fluctuating above and below the P-7 setpoint. Other procedure changes include having the electricians verify the springs are charged on breakers 309-1A and 309-1B prior to transferring the bus 1-1A and 1-1B power supply. The spring charge will also be checked on breakers 3T-lA and 3T-1B following the RCP bus transfer. While troubleshooting the 309-1A, the limit switch was mechanically and electrically tested. All indications showed no problems with the switch. It is believed that the vibration caused by rolling the breaker to the test stand was enough to free the brush. After the breaker was rolled to the test stand and tested, there were no failures of the charging motor. The breaker was reinstalled with no further problems. The preventive maintenance program for the 4160 volt breakers will be revised to address the potential failure modes.

ADDITIONAL INFORMATION

Component Manufacturer Model

Air Circuit Breaker Westinghouse 50-DH-P250

PREVIOUS SIMILAR EVENTS

None.

Figure 1 omitted.

CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD o EAST HAMPTON, CT 06424-3099

April 21, 1994
Re: 10CFR50.73(a)(2)(iv)

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Reference: Facility Operating License No. DPR-61
Docket No. 50-213
Reportable Occurrence LER 50-213/94-009-00

Gentlemen:

This letter forwards the Licensee Event Report 94-009-00, required to be submitted, pursuant to the requirements of the Haddam Neck Plant's Technical Specifications.

Very truly yours,

John P. Stetz
Vice President

JPS/mlg

Attachment: LER 50-213/94-009-00

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

William Raymond
Sr. Resident Inspector

Haddam Neck

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